



# What is uranium? Why is it special?

## What is special about uranium?

Some *atoms* are so unstable that they can split, or *fission*, thereby releasing energy. Some atoms need only a nudge from a neutron to fission. They are called '*fissile*'. In nature, there is only one fissile *isotope*, uranium-235. This makes uranium unique among the chemical elements.

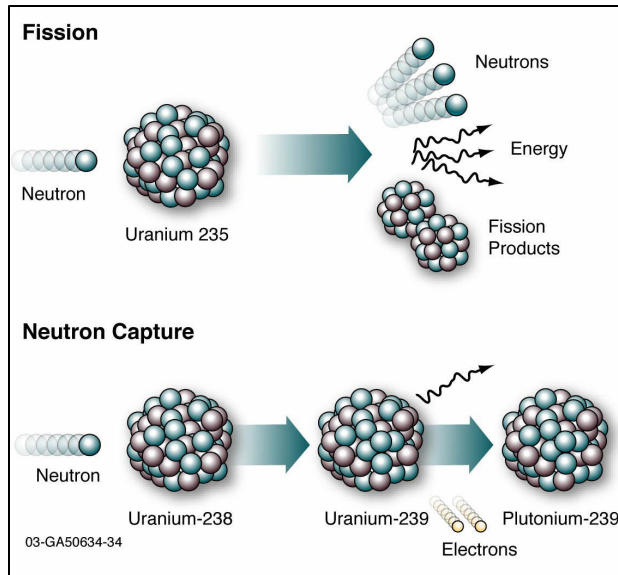


*Uranium ore is mined and refined into a yellow colored solid uranium compound referred to as "yellow cake". The yellow cake is converted into various uranium metal alloys or compounds to be used as nuclear fuel, such as the pellets shown in the picture.*

## What is the composition of natural uranium?

Uranium in nature has three isotopes. Only 0.72 percent of uranium isotopes is the fissile isotope, uranium-235. Most uranium, 99.2745 percent, is uranium-238. The rest, 0.0055 percent, is uranium-234.

Uranium-238 and uranium-234 are not fissile, but they are still valuable. They are called "fertile," which are atoms that become fissile when they absorb or capture a neutron. Uranium-234 absorbs a neutron and turns into uranium-235. Uranium-238 absorbs a neutron and eventually turns into plutonium-239, which is fissile but not found in nature.



## What is enriched uranium?

The amount of uranium-235 compared to uranium-238 determines how energetic nuclear fuel is. Natural uranium is not energetic enough to use as fuel in *light water reactors*; it cannot sustain fission reactions. Instead, such reactors need uranium with a higher fraction of uranium-235 than is found in nature, which is called "enriched". Light water reactors use fuel that is generally three to five percent uranium-235.

When used in current nuclear power plants, one uranium pellet the size of the tip of your little finger is equivalent to the energy provided by 1,780 pounds of coal, 17,000 cubic feet of natural gas, or 149 gallons of oil.